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10/530,131	01/24/2006	Jeremy John Hawkes	41577/314660	1024

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JOHN S. PRATT, ESQ
KILPATRICK STOCKTON, LLP
1100 PEACHTREE STREET
SUITE 2800
ATLANTA, GA 30309

EXAMINER

COLEMAN, RYAN L

ART UNIT	PAPER NUMBER
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1714

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/530,131	Applicant(s) HAWKES ET AL.	
	Examiner RYAN COLEMAN	Art Unit 1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4, 5, 7-11, and 14-17 is/are pending in the application.
- 4a) Of the above claim(s) 9-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7, 8, and 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendments filed June 30, 2010 are acknowledged. Claims 3, 6, 12, and 13 are cancelled. Claims 1, 2, 4, 5, 7-11, and 14-17 are pending, and claims 9-11 have been withdrawn from consideration.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 15-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 15 specifies that the apparatus uses "only" one transducer to generate a stationary standing sound wave. Although the written description teaches embodiments in which one transducer is used to generate a stationary standing sound wave (such as in Par. 0037-0040 of applicant's pre-grant publication U.S. 2006/0163166), the written description does not teach the concept that "only" one transducer is used to generate a stationary standing sound wave. Claims 16 and 17 depend from claim 15. This is a new matter rejection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 5, 15, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2006/0037915 by Strand et al. (hereafter referred to as “Strand”).

6. With regard to claim 1, Strand teaches an apparatus for moving particles entrained in a first fluid to a second fluid (Par. 0001, 0072, 0073; Figure 21). The apparatus has a first wall (reads on *first wall of the conduit configured to generate and transmit a sound wave*) comprising a transducer (item T in Figure 21) and a second, opposite wall comprising a surface (item M in Figure 21) that can reflect ultrasonic radiation generated by the transducer (Par. 0001, 0072, 0073; Figure 21). Strand teaches using the transducer and the reflecting surface to produce a stationary, standing sound wave in a region of the conduit formed between the first wall and the second wall such that particles attracted to the centrally-disposed pressure node of the standing wave are moved from the first fluid to the second fluid (Par. 0073; Figure 21). The conduit formed between the first wall and the second wall is in communication with

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a 25 micron first inlet and a 25 micron first outlet for the first fluid such that the first fluid flows through the first inlet in order to reach the region with the standing wave and the first fluid flows through the first outlet after it leaves the region with the standing wave (Par. 0073; Figure 21). The conduit formed between the first wall and the second wall is also in communication with a 75 micron second inlet and a 75 micron second outlet for the second fluid such that the second fluid flows through the second inlet in order to reach the region with the standing wave and the second fluid flows through the second outlet after it leaves the region with the standing wave (Par. 0073; Figure 21). The second wall is considered to comprise the second inlet and second outlet because, as shown in Figure 21, the second wall serves as one of the walls for both the second inlet and the second outlet.

7. With regard to claim 5, as shown in Figure 21, the standing wave's pressure node is centrally disposed along the longitudinal length of the conduit formed between the first wall and the second wall.

8. With regard to claim 15, Strand teaches only using one transducer as the means of generating the stationary standing wave (Par. 0073 and Figure 21).

9. With regard to claim 16, as shown in Figure 21, the transducer comprises part of the first wall of the conduit (Par. 0073 and Figure 21).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2006/0037915 by Strand.

14. With regard to claim 14, in the apparatus of Strand, as discussed in the rejection of claim 1, the second inlet and the second outlet do not contact the first wall.

15. In accordance with MPEP 2144.04, *Rearrangement of Parts*, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the

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apparatus of Strand by switching the position of the transducer and the reflective surface such that the bottom wall of the conduit in Figure 21 then reads on applicant's *first wall* and the top wall of the conduit in Figure 21 then reads on applicant's *second wall*. This modification would not affect the performance of the apparatus because a centrally disposed node would still be used to move particles from the first fluid to the second fluid. The motivation for performing the modification was provided by Strand, who taught that such an arrangement of transducer and reflective surface can form such a node that can move particles from one fluid to another. In this modified apparatus of Strand, the bottom wall of the conduit (applicant's *first wall*) is considered to comprise the second inlet and second outlet because, as shown in Figure 21, the bottom wall serves as one of the walls for both the second inlet and the second outlet, and the first inlet and first outlet are considered to communicate with the upper wall of the conduit (applicant's *second wall*) because the upper wall is exposed to liquid flowing through the first inlet and first outlet.

16. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2006/0037915 by Strand in view of U.S. Patent Application Publication No. 2004/0069708 by Laurell et al. (hereafter referred to as "Laurell").

17. With regard to claim 2, the teachings of Strand are discussed in the rejection of claim 1.

18. In Strand's apparatus, the first fluid and the second fluid contact each other in the region of the pressure node, but Strand does not explicitly teach that the apparatus

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minimizes mixing between the two fluids by providing contacting laminar flow of each liquid.

19. Laurell teaches that when using acoustic waves to move particles between different liquid regions, it is advantageous to provide contacting laminar flow between the regions such that the acoustic nodes can be used to control the movement of the particles through the regions and the regions can then be separately directed towards their appropriate outlets (Par. 0019 and 0026-0029).

20. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Strand such that contacting laminar flow of each liquid is provided in the region where the two liquids contact each other. The motivation for performing the modification was provided by Laurell, who teaches that when using acoustic waves to move particles between different liquid regions, it is advantageous to provide contacting laminar flow between the regions such that the acoustic nodes can be used to control the movement of the particles through the regions and the regions can then be separately directed towards their appropriate outlets.

21. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2006/0037915 by Strand in view of U.S. Patent No. 4,743,361 to Schram.

22. With regard to claim 4, in Strand's apparatus, the first inlet and the first outlet are parallel to the second inlet and the second outlet.

23. Schram teaches an apparatus for moving particles entrained in a first liquid to a second liquid that includes a conduit defined by a first wall with a window (item 310 in

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Figure 11) and a second, opposite wall with a window (item 308 in Figure 11; Col. 18, line 61 to Col. 19, line 66). The conduit is in communication with a first inlet (item 316 in Figure 11) and a first outlet (item 320 in Figure 11) for a first liquid that comes from a first container (item 324 in Figure 11). As shown in Figure 11, the first wall with window 310 comprises a second inlet (item 318 in Figure 11) and a second outlet (item 322 in Figure 11) for a second liquid (Col. 18, line 61 to Col. 19, line 58). Schram teaches using ultrasonic transducers (items 304 and 306) to generate a standing sound wave having a pressure node disposed within the conduit (Col. 18, line 61 to Col. 19, line 31; Col. 17, line 52 to Col. 18, line 28). Schram teaches that the standing wave causes particles to move from the first liquid to the second liquid (Col. 18, line 61 to Col. 19, line 31). As shown in Schram's Figure 11, the second inlet and the second outlet are orthogonal to the first inlet and the first outlet. The apparatus of Schram allows particles to be moved between two liquids while advantageously minimizing mixing between the two liquids because Schram teaches having guide vanes (item 317 in Figure 11) that ensure a parallel streamline flow of liquid through the first inlet as the second liquid enters through the second inlet (Col. 19, 12-31).

24. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Strand such that the first inlet and first outlet are orthogonal to the second inlet and second outlet (2144.04, *Rearrangement of Parts*). One of ordinary skill in the art could have used known techniques to perform the modification, and the results would have been predictable to one of ordinary skill in the art. The motivation for performing the modification was provided by Schram, who

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taught that when using a standing acoustic wave to move particles from a first liquid to a second liquid in a system where different inlets and outlets bring the two liquids into a region where the particles are exposed to the standing wave, the inlet and outlet for the second liquid can be orthogonal to the inlet and outlet for the first liquid such that the liquids can be advantageously brought into contact with each other without mixing.

25. Claims 7, 8, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2006/0037915 by Strand in view of International Application Publication WO 98/50133 by Coakley et al. (hereafter referred to as "Coakley").

26. With regard to claims 7, 8, and 17, Strand does not explicitly teach that the transducer of the first wall comprises a piezoceramic material.

27. Coakley teaches an apparatus for using stationary standing acoustic wave nodes produced with a piezoelectric transducer to move suspended particles within a liquid flowing through a conduit (Abstract; Page 4, line 5 to Page 5, line 18; Figure 1). Coakley teaches that the piezoelectric transducer is powered with an alternating potential source, and Coakley teaches that the transducer used to generate the standing wave can be appropriately positioned in the apparatus by having a recess in an outer surface of a conduit wall and positioning the transducer (item 20 in Figure 1) within the recess (Page 4, 5-33; Figure 1). In such a system, the wall with the recess is considered to generate and transmit the sound wave because the transducer is positioned within a recess of the wall.

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28. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Strand such that the transducer that generates and transmits the sound wave is a piezoelectric transducer powered with an alternating potential source and positioned within a recess formed in a wall that forms the first wall. The motivation for performing the modification was provided by Coakley, who teaches that such a piezoelectric transducer positioned within such a recess could advantageously function to generate and transmit a standing sound wave that can move suspended particles within fluid.

Response to Arguments

29. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection. This is a non-final rejection.

30. Applicant argues against the examiner's "new matter" rejection of claims 15-17 by saying that since the written description refers to "a" transducer instead of multiple transducers and since the drawings don't show multiple transducers being present, the limitation of claim 15 stating that "only one" transducer is part of the means of generating a stationary standing sound wave is supported. However, the limitation specifying that "only one" transducer is part of the means of generating a stationary sounding wave excludes the possibility of there being more than one transducer as part of the means of generating a stationary sounding wave, and this negative limitation is simply not supported by the specification as originally filed.

Conclusion

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN COLEMAN whose telephone number is (571)270-7376. The examiner can normally be reached on Monday-Friday, 9-5.

32. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

33. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Barr/
Supervisory Patent Examiner, Art
Unit 1711

/RLC/
Ryan L. Coleman
Patent Examiner, Art Unit 1714
September 11, 2010

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